

## MOTION ACTUATOR

### ABSTRACT

A motion actuator comprises a cylindrical movable shaft and a stage that contains an expansible/contractible device and two clamps. The

5    expansible/contractible device can be controlled to drive the axial motion of the movable shaft, and the two clamps can be controlled to grip/release the shaft. The two clamps and the expansible/contractible device are each controlled by a bimorph structure, which comprises a cut cylindrical piezoelectric tube section in a hole enclosed by a thin wall in the stage. By sequentially activating the three piezoelectric

10    tube sections, axial motions of the movable shaft relative to the stage in small steps are made. Each of the two clamps can be adjusted by a screw, which presses a spring structure that makes contact with the top surface of the movable shaft, so that the clamps can grip the movable shaft firmly when actuated, but not when not actuated. The flat top surface of the movable shaft is designed to inhibit the possible

15    rotation along its axis during its axial motion. The shaft is supported by two lines at the bottom of each of the two clamps to reduce the contact area, which improves the reliability of the motion.